A new species of the genus *Bathyphlebia* C. & R. Felder, 1874 from Peru (Lepidoptera: Saturniidae, Ceratocampinae)

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Abstract: A new species of the genus *Bathyphlebia* C. & R. Felder, 1874 is described from the Oriental Cordillera in Southern Peru, Cuzco Departamento: *Bathyphlebia **aglioides*** **sp. n.** Male holotype, a male paratype and genitalia structures are figured. This southernmost known species of the genus is compared with its probable closest relative, *B. aglia* C. & R. Felder, 1874, which is the northernmost representative on the other side. All other members of the genus which are known from the area in between and differ clearly from both mentioned species, are shortly presented. The new species was already mentioned and described in detail by Lemaire (1988) but no name applied yet.

Key words: *Bathyphlebia **aglioides*** **new species,** southern Peru, Cordillera Oriental, generic overview.

Eine neue Art der Gattung *Bathyphlebia* C. & R. Felder, 1874 aus Peru (Lepidoptera: Saturniidae, Ceratocampinae)

Zusammenfassung: Eine neue Art der Gattung *Bathyphlebia* C. & R. Felder, 1874 wird aus der Ostkordillere in Südperu, Cuzco Departamento, beschrieben: *Bathyphlebia **aglioides*** **sp. n.** Männlicher Holotypus, ein männlicher Paratypus und die Genitalstrukturen werden abgebildet, und die hier beschriebene Art, die den südlichsten bekannten Vertreter der Gattung darstellt, wird verglichen mit *B. aglia* C. & R. Felder, 1874, der nördlichsten bekannten Art. Alle übrigen Arten der Gattung, die im Bereich zwischen diesen beiden Vertretern vorkommen und sich weit deutlicher von den beiden vorgenannten Arten unterscheiden, werden kurz besprochen. Die hier neubeschriebene Art wurde bereits von Lemaire (1988) erwähnt und ihre Unterschiede zu *B. aglia* im Detail beschrieben, seitdem aber kein Name hierfür vergeben.

Una nueva especie del género *Bathyphlebia* C. & R. Felder, 1874 de Perú (Lepidoptera: Saturniidae, Ceratocampinae)

Resumen: Se describe una nueva especie del género *Bathyphlebia* C. & R. Felder, 1874, proveniente de la Cordillera Oriental en el sur de Perú, departamento de Cuzco (Lepidoptera: Saturniidae, Ceratocampinae): *Bathyphlebia **aglioides*** **sp. n.** Se ilustra con imágenes del holotipo macho, de un paratipo macho y de las estructuras genitales. Este representante más sureño de su género se compara con el representante más septentrional, *B. aglia* C. & R. Felder, 1874. Las demás especies del género que pueden encontrarse en la zona geográfica entre los dos representantes arriba mencionados y que se distinguen de manera bien clara de ellos, se describen de forma resumida. La nueva especie descrita aquí fue mencionada ya de Lemaire (1988), que definó detalladamente sus diferencias con *B. aglia;* sin embargo, desde entonces no se le ha atribuido un nombre.

Introduction

During several expeditions into the Peruvian area around Machu Pichu by J. A. Bottger, interesting records of Saturniidae from higher altitudes in the Departamento Cuzco were achieved. Some Hemileucinae have already been described from results of a first expedition (Naumann et al. 2005). Here follows the description of an interesting representative of the subfamily Ceratocampinae, genus *Bathyphlebia* C. & R. Felder, 1874.

This new species is very similar to the oldest species in the genus *Bathyphlebia,* the type species *B. aglia* C. & R. Felder, 1874, which was described from Colombia and is only known from there and nearby southwestern parts of Venezuela in the Central and Eastern Andean Cordillera. In his monography of the Ceratocampinae, Lemaire (1988: 76) already mentioned under *B. aglia* a population of the species from the Eastern Cordillera in southeastern Peru, which is externally indistinguishable from *B. aglia,* but shows genitalic differences. Lemaire even figured these differences of their ♂ genitalia in comparison to *B. aglia;* but he never gave it a name.

The presently known ranges of the higher Andean species of the genus *Bathyphlebia* support the hypothesis that this southernmost population is a separate species. From the area in between these two species (*B. aglia* and the new one described here) there are only other species of the genus known which all are more easily recognisable because they show better external differences. These other species are also discussed. An additional ♂ singleton which also belongs into this group (and also is externally indistinguishable from *B. aglia* as well as from the new species) was found in the northern Peruvian province of Cajamarca (see below in the discussion). Further a few comments are given on the genus *Bathyphlebia*.

Collection abbreviations

AMNH	American Museum of Natural History, New York, USA.
BMNH	The Natural History Museum [formerly British Museum (Natural History)], London, U.K.
CBH	Collection Brosch, Hille, Germany.
CSNB	Collection Stefan Naumann, Berlin, Germany.
MHNL	Muséum d'Histoire naturelle de Lyon, France.
MNHN	Muséum nationale d'Histoire naturelle de Paris, France.
MNHU	Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany.
NHMW	Naturhistorisches Museum Wien, Austria.
USNM	United States National Museum, Washington, USA.
ZSM	Zoologische Staatssammlungen München, Germany.

Other abbreviations used

fw.	Forewing.
fwl.	Forewing length, measured in a straight line from the most distant point of the apex to the wing base, without the width of the thorax.
GP	Genitalia preparation (dissection no.).
HT	Holotype.

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hw. Hindwing.
LT Lectotype.
PT Paratype.
TL Locus typicus.

Systematic part

Bathyphlebia aglioides sp. n.

Holotype ♂ (Figs. 1, 2): Peru, Cuzco Departamento, Quillabamba Provincia, Huayopata Distrito, Carrizales, 3200 m, 13°5′25.5″ S, 72°23′17.0″ W, humid rain forest, III. 2006, leg. José Bottger, GP 1497/06 Naumann, ex CSNB, will be deposited in MNHU. A red holotype label will be fixed accordingly.

Paratypes (in total 6 ♂♂), all from Peru, with data: 1 ♂, Cuzco Dept., Quillabamba Prov., Huayopata Distr., Carrizales, 3000 m, 13°5′25.5″ S, 72°23′17.0″ W, humid rain forest, III. 2006, leg. José Bottger (CSNB); 1 ♂, Cuzco, Quillabamba, Huayopata, Carrizales, 3240 m, humid rain forest, 13°5′25.5″ S, 72°23′17.0″ W, III. 2005, leg. José Bottger, Oxapampa, GP CBH 0474 (CBH); 1 ♂, Cuzco, Wiñayhuayna, Inka Trail, 19. IV. 1987, gefangen 9.00 h [= 21.00 h?], coll. Kager (ZSM); 1 ♂, Cuzco, Carrizales, 3200 m, 10. IV. 2004, leg. José Bottger, received from B. Wenczel 2008 (CSNB); 1 ♂, [Madre de Dios Dept.], Rte. Cuzco–Manu, K [= km] 115, 3200 m, 8. XII. [19]79, leg. T. Porion, coll. Lemaire (MNHN); 1 ♂, Madre de Dios, route Cosnipata–Manu, km 40 [not km 100 as mentioned in Lemaire 1988: 76 ; pers. comm. J. Minet], 2200 m, 25. VIII. [19]73, leg. H. Descimon; "Touffe anale jaune chrome"; GP C. Lemaire 3065; coll. Lemaire (MNHN).

Derivatio nominis: The name refers to the strong similarity of the species with *B. aglia;* it is to be treated as a noun in apposition.

Description

♂ (Figs. 1, 2, 3): generally, together with *B. aglia,* the largest species within the genus, with a fwl. of 63–65 mm (HT 64 mm). Ground colour chestnut brown, antennae light brown, 12.7–13.0 mm long, quadripectinate almost to the tip, with around 31 segments, length of longest rami 0.85 mm. Labial palpi, frons and collar hairy yellow, prothorax with dark hair, thorax and abdomen on dorsal side in ground colour, with yellow intersegmental hairs. On ventral side thorax, abdomen and femur dark brown, suffused with yellow hairs, tibiae and tarsi of pinkish violet colour. Abdomen with a yellow anal tuft. Fw. dorsally at its base also with a yellow tuft, then in ground colour, a weakly indicated wing ocellus with a small white central dot and an indicated yellowish proximal shade, postmedian line black, followed by an outer white shadow and ending in the apical tip. The postmedian area of 8 mm width in maximum, outer margin again in ground colour. The whole fw. is, somewhat variable among the specimens, suffused with black dots, consisting each of a patch of several scales. Hw. upperside with yellow front part and hairy main part in ground colour, with a large central, rounded black wing ocellus of a maximum diameter of 8.0–9.0 mm (holotype 8.0 mm) with white central dot, and a broad black postmedian line, followed in the lower parts by a pinkish white shadow. Postmedian area again in ground colour. The form of the postmedian line is not consistent, there are straight, a little convex and a little concave lines. On the ventral side wing colours more vivid, of pinkish shade which originates from the brown ground colour which is suffused with lots of yellow and white scales and small black dots. On both fw. and hw. basal parts along the lower margin with long yellow hair, and with round or ovoid ocelli in the chestnut brown ground colour, circled with a black ring and showing a white center. Postmedian lines on both fore- and hindwing of same colour as on dorsal side, but slightly indented along the veins; postmedian area pinkish brown

♂ **genitalia** (Figs. 7–8): The genitalia structures of *B. aglioides* show consistent differences to those of *B. aglia* (compare Fig. 9) as mentioned and figured already by Lemaire (1988: 76). He only had one dissection in his hands when finishing his manuscript for the Ceratocampinae revision and was not sure whether this was an individual variation or a specific character. The uncus of *B. aglioides* has two lateral protuberances, the dorsal tip a slight protuberance on the dorsal surface and thereby a shorter apical tip compared to *B. aglia* (Fig. 9). Both ventral and dorsal process of the valves are somewhat broader and more compact in *B. aglioides,* the juxta has 2 more rounded lateral lobes, compared to the more pointed ones in *B. aglia*. The saccus of *B. aglioides* is more slender (which cannot be seen very good in the figured preparation), compared to the rounded one in *B. aglia*. The phallus of *B. aglioides* is a little shorter than that of *B. aglia,* and the vesica with a small indention where it emerges from the distal end of the phallus to ventral direction, just as figured already by Lemaire.

♀: Unknown.

Diagnosis

Superficially, *B. aglioides* resembles in many aspects the rare *B. aglia* so that it is hard to find consistent differences aside of the different ♂ genitalia structures which were already mentioned by Lemaire (1988: 76) in detail. The outer tip of the fw. apex is a little lighter, yellowish, and on the ventral side there is a stronger ornamentation in *B. aglia* on average. Both taxa are known only from a few specimens which are somewhat variable in their colouration, which makes it even harder to find consistent external differences. Judging from the known range of both species, with only clearly different species occuring in the large area in between, it seems to be evident that *B. aglia* and *B. aglioides* are two different species. All other species (see list below) differ by their smaller size, lighter, more orangy ground colour, and ♂ genitalia. Also in recent literaure, e.g. in Racheli & Racheli (2006: 203), both species were not yet recorded for the fauna of Ecuador.

B. aglioides was mentioned in literature as *B. aglia* by Lemaire (1988) and, most recently, in an internet publication from the Peruvian Cordillera de Vilcabamba (Plan Maestro Parque Nacional Otishi 2008: 22). Notes about the collecting locality of the paratype specimen in ZSM can be found in the internet under Incatrail (2008); the

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mentioned locality "Wiñayhuayna" can be found there on the Incatrail map as "Wiñay Wayna".

Discussion

Judging from the revision of the subfamily Ceratocampinae by Lemaire (1988) and with description of the new taxon above currently 6 species are recognized within the genus *Bathyphlebia*. These are mentioned with short notes in the following part, and their ♂ genitalia (except of those of *B. johnsoni* Oiticica Filho & Michener, 1950 which were not available to us) are figured for the first time on photographs. Those of *B. eminens* (Dognin, 1891) were already also figured by Oiticica Filho (1956: 9, 11).

With regard to the authorship of the genus *Bathyphlebia* and the species *aglia* we currently follow the interpretation by Nässig & Speidel (2007), although we had a slightly different interpretation of this question prior to their publication.

Bathyphlebia C. & R. Felder, 1874

Bathyphebia: C. & R. Felder (1874: 2, pl. 87). – Typus generis by monotypy: *B. aglia* C. & R. Felder, 1874.

Note: Presently a single ♂ with the external appearance of *B. aglia* or *B. aglioides* from the Western Andean Cordillera, originating in Cajamarca Dept. in northern Peru (Cutervo, 2100 m, ii. 2007, leg. local collectors, via R. Marx iii. 2007 in CSNB) cannot be classified with certainty to any of the species, as the abdomen unfortunately was destroyed by ants still in Peru before genitalia could be examined. Judging from the collecting locality in the Andean Central Cordillera it may as well be either *B. aglioides* or *B. aglia,* which would show a much wider range than known before for either species, or just another, undescribed species.

B. aglia C. & R. Felder, 1874

B. aglia: C. & R. Felder (1874: 2, pl. 87). – TL: [Colombia], Bogotá, [leg.] Lindig. – LT deposition: BMNH.

Material examined: 1 ♂, "Colombie, Bogotá, 1985", coll. Terral, MHNL no. 47001383, GP 1070/04 Naumann (MHNL) (Figs. 4, 5, 11, 14, genitalia Fig. 9).

= *B. gschwandneri* Schawerda, 1925(:57, pl. II fig. 2). – TL: Colombia, Volcan de Tolima, 2200 m, leg. A. H. Fassl, coll. Gschwandner. – HT deposition: NHMW.

Material examined: ♂ holotype (Figs. 4, 5).

B. aglioides sp. n.

TL: Peru, Cuzco Dept., Quillabamba, Huayopata Distr., Carrizales, 3200 m, 13°5′25.5″ S, 72°23′17.0″ W. – HT deposition: MNHU.

Material examined: Type series, see above (Figs. 1, 2, 3, genitalia Figs. 7, 8).

B. rufescens Oiticica Filho & Michener, 1950

B. rufescens: Oiticica Filho & Michener (1950: 11, figs. 2, 14, 15). – TL: Ecuador, Guayaquil [erroneous, compare Lemaire 1988: 81]. – HT deposition: USNM [not examined].

Material examined: 1 ♂, Equateur, Pichincha, Rte. Nono–Los Bancos, km 37, 2385 m, 11.–12. i. 1983, [leg.] Lemaire & Venedictoff, GP 1071/04 Naumann, coll. Lemaire (MHNL) (Figs. 12, 15, genitalia Fig. 19).

B. johnsoni Oiticica Filho & Michener, 1950

B. johnsoni: Oiticica Filho & Michener (1950: 1, figs. 5–9). – TL: Peru, Apurimac, Río Piene. – HT deposition: AMNH (not examined).

Material examined: none.

B. flavior Oiticica Filho & Michener, 1950

B. flavior: Oiticica Filho & Michener (1950: 7, figs. 1, 3, 4, 10–13). – TL: Peru, Huánuco, Carpish Pass, 2700 m. – HT deposition: AMNH (not examined).

Material examined: 1 ♂, Ecuador oriente, Morona-Santiago, Piste Gualaceo–Limon, P.K. 43, 2200 m, 1. viii. [19]88, leg. P. Widen, GP 1072/04 Naumann, coll. Terral, MHNL no. 47001387 (Figs. 10, 13, genitalia Fig. 18)(MHNL); 12 ♂♂, 5 ♀♀, Peru, Pasco Dept., Oxapampa env., different altitudes 1800–2511 m, iv. 1999, 20. vii. 2001, vi. & ix. 2002, iv. & v. 2003, vi. 2004, v. & vi. 2005, leg. J. Bottger & B. Wenczel, ♂ GP 1091/04 Naumann (genitalia Fig. 17) (CSNB); 1 ♂, Peru, Junin Dept., Calabaza, 2300 m, 9. iv. 1998, via B. Wenczel (CSNB).

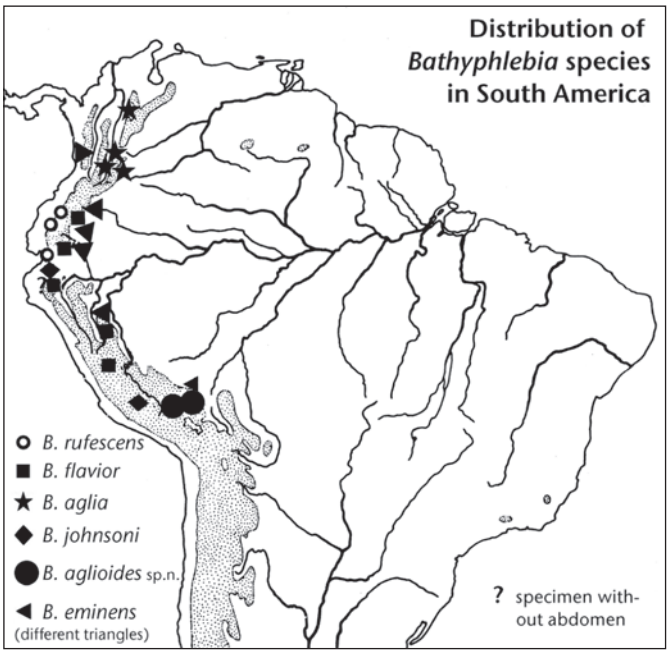
B. eminens (Dognin, 1891)

B. eminens: Dognin (1891: 36). – TL: Ecuador, San Francisco près Loja, 2000 m. – LT deposition: USNM [not examined].

Material examined: 1 ♂, Ecuador oriente, Napo, Cosanga–Bangayako, pk. 16.5, 1915 m, leg. D. Herbin (CSNB); 1 ♂, Peru, Amazonas Dept., Vista Alegre, 2200 m, x. 1999, via R. Marx, GP 1089/04 Naumann (genitalia Fig. 20) (CSNB); 3 ♂♂, Peru, Madre de Dios Dept., Camicana Chico env., 400–1200 m, ca. 1997, via R. Marx (Fig. 16) (CSNB); 1 ♀, Peru, Amazonas Dept., Vista Alegre, 2000 m, x. 1999–ii. 2000 (Fig. 6) (coll. Lemaire in MHNL).

Coments on the genus *Bathyphlebia*

There were always different interpretations about the ranking of the genus *Bathyphlebia* in literature; from the original description to Bouvier (1929: 248) it was accepted as a valid genus, but Bouvier (1930: 552) synonymised it with *Eacles* Hübner 1819 ["1816"], and he was followed by Draudt (1930: 803), Bouvier (1931: 128 *ff.*), and Schüssler (1936: 164). Travassos & Noronha (1965: 82 *ff.*) listed *B. aglia* and *B. eminens* under *Eacles,* but mentioned that they should belong to a separate genus. Michener (1952: 385), revising the species of *Bathyphlebia* and giving a table of generic characters of *Bathyphlebia* and *Eacles,* listed the taxa *tyrannus* Draudt, 1930 and *peruvianus* Bouvier, 1927 as species



Map 1: Distribution data of *Bathyphlebia* species in South America. Map from Lemaire (1988: 77, fig. 48), modified and supplemented.

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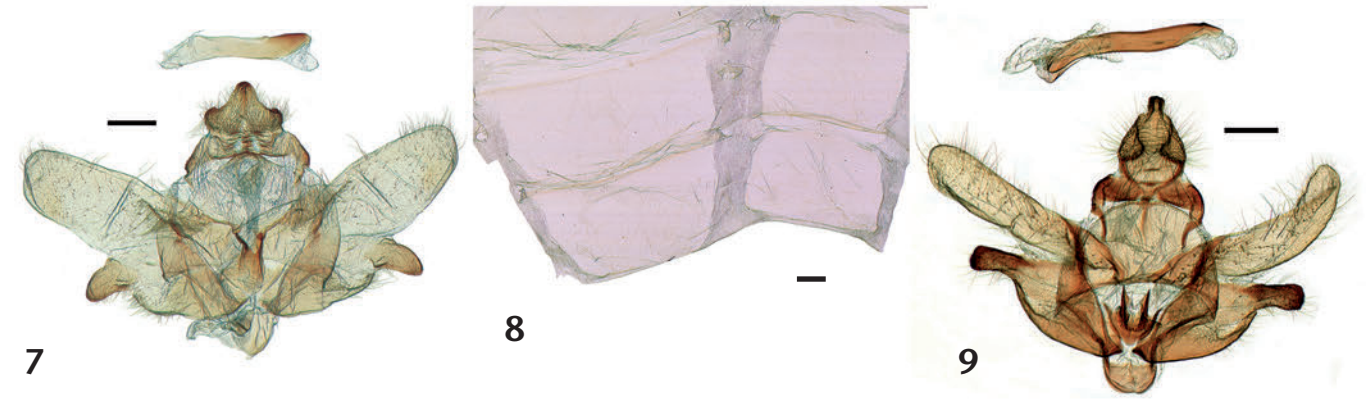

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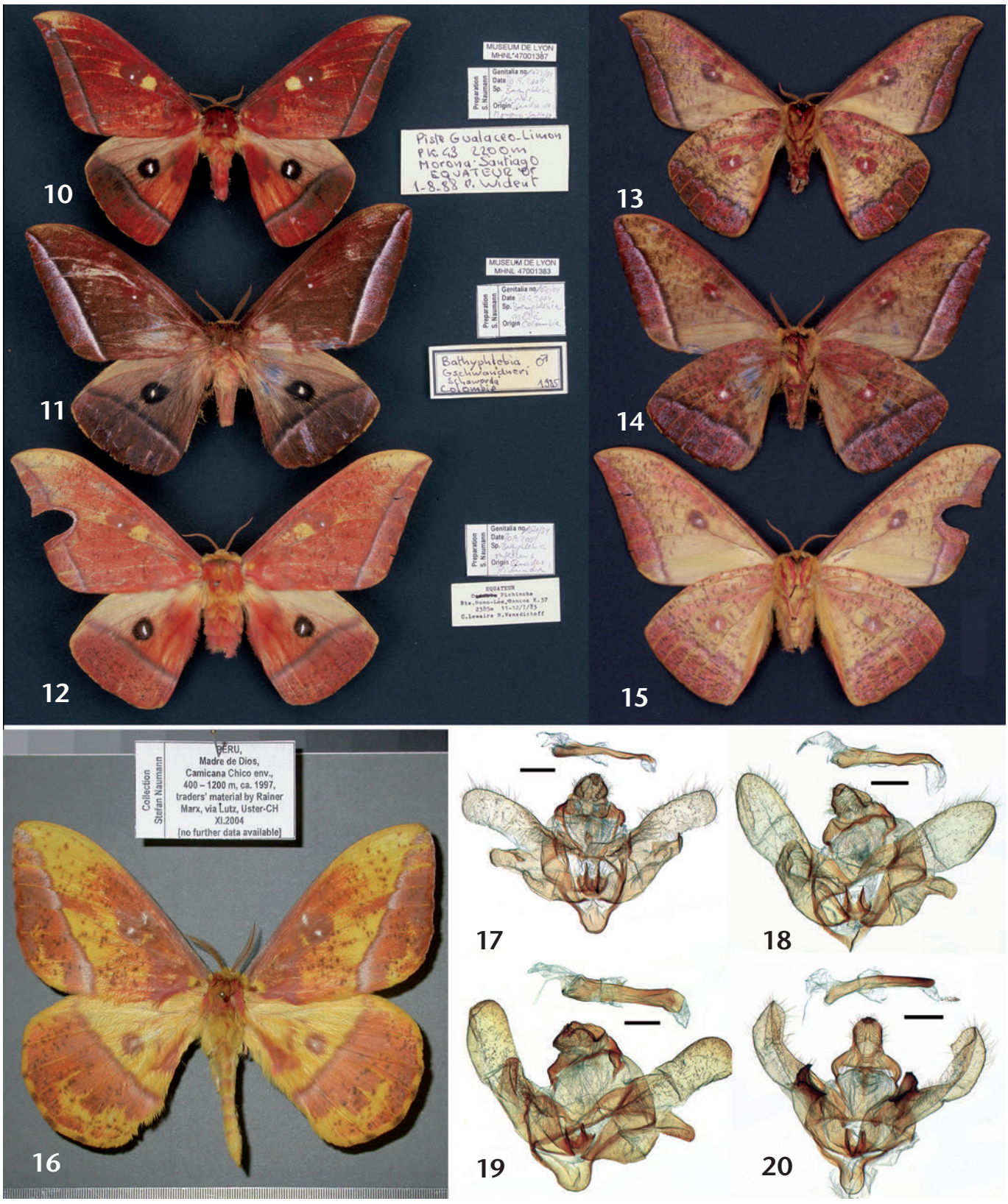

Colour plate 1, Figs. 1–6: *Bathyphlebia* species, specimens. **Figs. 1, 2:** *B. aglioides* HT ♂, Peru, Cuzco Dept. (CSNB > MNHU). Fig. 1: dorsal view, Fig. 2: ventral view. **Fig. 3:** *B. aglioides,* ♂ PT, Peru, Cuzco Dept., dorsal view (CSNB). **Figs. 4, 5:** *B. aglia* ♂, HT of *B. gschwandneri,* Colombia, Volcan de Tolima (NHMW). Fig. 4: dorsal view, Fig. 5: ventral view. **Fig. 6:** *B. eminens* ♀, Peru, Amazonas, Vista Alegre, 2000 m (coll. Lemaire in MNHN), dorsal view. — Specimens not to the same scale; scale bars (where present) = 1 cm. — **Figs. 7–9:** *Bathyphlebia* species, ♂ genitalia. Figs. 7, 8: *B. aglioides* HT ♂, Peru, Cuzco, GP 1497/06 SNB; Fig. 7: genitalia, Fig. 8: abdominal pelt. **Fig. 9:** *B. aglia* ♂, Colombia, Bogotá, GP 1070/04 SNB (MHNL). — Genitalia and pelt not to the same scale; scale bars = 1 mm.

Colour plate 2, Figs. 10–16: *Bathyphlebia* species, specimens. **Figs. 10, 13:** *B. flavior* ♂, Ecuador, Morona-Santiago (MHNL). Fig. 10: dorsal view, Fig. 13: ventral view. **Figs. 11, 14:** *B. aglia* ♂, Colombia, Bogotá (MHNL). Fig. 11: dorsal view, Fig. 14: ventral view. **Figs. 12, 15:** *B. rufescens* ♂, Ecuador, Pichincha (MHNL). Fig. 12: dorsal view, Fig. 15: ventral view. **Fig. 16:** *B. eminens* ♂, Peru, Dept. Madre de Dios, Camicana Chico env., 400–1200 m, ca. 1997, leg. R. Marx (without exact data) (CSNB). — Specimens 10–15 versus 16 not to the same scale; scale in Fig. 16 in 0,5 mm steps. — **Figs. 17–20:** *Bathyphlebia* species, ♂ genitalia. **Fig. 17:** *B. flavior* ♂, Peru, Pasco, GP 1091/04 SNB (CSNB). **Fig. 18:** *B. flavior* ♂, Ecuador, Morona-Santiago, GP 1072/04 SNB (MHNL). **Fig. 19:** *B. rufescens* ♂, Ecuador, Pichincha, GP 1071/04 SNB (MHNL). **Fig. 20:** *B. eminens* ♂, Peru, Amazonas, GP no. 1089/04 SNB (CSNB). — Genitalia to the same scale; scale bars = 1 mm.

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in *Bathyphlebia;* however, these both were later classified again with the genus *Eacles* by Travassos & Noronha (1967), then at specific rank (those authors even introduced an unneccesary subfamily Bathyphlebiinae which, of course, was synonymised with Ceratocampinae by Lemaire). Finally, Lemaire (1976) interpreted those two taxa as subspecies of *E. masoni* Schaus, 1896 and *E. ormondei* Schaus, 1889, respectively.

The main problem to find convincing (and probably apomorphic) characters for *Bathyphlebia* is the somewhat unsatisfactory persisting inclusion of *B. eminens* in the genus since Michener (1952). *B. eminens* shares, aside some rather weak characters of *Bathyphlebia* such as "antennae pectinate to apex" and similar genitalia structures, so many characters with some of the species included today in *Eacles* (e.g., *E. masoni, E. ormondei* and *E. adoxa* Jordan, 1910) that its classification with *Bathyphlebia* remains doubtful, although ♀♀ (compare Fig. 6) show the same yellow ground colour as known for the other *Bathyphlebia* species, but again also for several *Eacles*-♀♀. However, no taxonomic changes are proposed here before further studies are finished. Especially some DNA analyses within the BOLD project in Canada (see Barcode of Life 2008) of the involved taxa, especially of *B. eminens* and the Cajamarca record, should hopefully bring some more knowledge and ideas for a proper classification.

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